

## **Discussion Paper and Working Paper Series**

# **Distribution Trade Sector Output and Productivity Performance: A Case Study of Singapore and Hong Kong 2001-2008**

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### **Abstract:**

This paper employs the industry of origin approach to compare value added and productivity of Singapore and Hong Kong's Distribution Trade Sector for the period 2001-2008.

The direct comparison between these two economies was motivated by the statements of the Singapore government: Its services sector, especially in Retail Trade, lags behind Hong Kong's productivity levels. The results show that since 2005, Singapore's Distribution performance in terms of labour productivity was below Hong Kong's level, which was largely due to poor performance in its Retail Trade sector arising from an influx of foreign workers. Results from total factor productivity (TFP) between these two economies also suggest that Hong Kong's better performance (since 2005) was largely due to its ability to employ more educated and trained workers with limited use of capital. The results suggest that policies that worked in Hong Kong may not work for Singapore because its population is more diverse which poses a challenge to policy-makers in raising its productivity level.

JEL Classifications: C43; D24; L81; O47

Keywords: Purchasing power parities, distribution trade, wholesale trade, retail trade, total factor productivity, labour productivity

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## 1. Introduction

The Wholesale and Retail trade sector, also known as the Distribution Trade Sector, has become a major component of Singapore's services sector and a driving force of growth of the Singapore economy. Since 2000, it has become the fastest growing sector averaging 8.1 per cent per annum in real terms since 2000 (MTI, 2008). In 2008, the Distribution Trade Sector was the second largest sector in the economy, accounting for 17 per cent of Singapore's GDP. This outcome is comparable to similar export-oriented economies such as Hong Kong (25 per cent share of GDP) and Taiwan (19 per cent) (MTI, 2008), and it was the main contributor of total value added for the services sector at 32.6 percent ahead of the Real Estate and Business services sector (23.9 percent), the Transport sector (17.2 percent), and the Financial sector (6.2 percent) (Singapore Department of Statistics, 2009).

Recently, the Singapore government has shown concern over the lagging productivity performance of Singapore's economy, especially in the services sector. Labour productivity growth drawn from the *Yearbook of Statistics 2010* shows productivity change in services declining since 2004, which had a change in labour productivity to 6.4 percent but had since fallen to a low of -1.9 percent in 2008 and -9.9 percent in 2009. In the Distribution Trade Sector, change in labour productivity was 15 percent in 2004 and fell to a low of -3.5 percent in 2008 and -4.9 percent in 2009. According to ESC 2010, Singapore's productivity in the Retail Trade sector lags behind Hong Kong's (75% of Hong Kong's level). ESC 2010 reports Hong Kong's services sector productivity grew by 3.1 per cent per year between 1999 and 2008, and that the Retail Trade sector improved significantly. The Distribution Trade Sector alone grew by 3.3 percent in 2008 while imports and exports grew by 9.4 percent in 2008<sup>1</sup>.

To date, few studies on efficiency and productivity growth of Singapore's service sector have been done, and those addressed the period before 2000 (Mahadevan, 2000, 2002; Kong and Tongzon, 2006). The current paper focuses on a recent period (2001-2008) of Singapore's Distribution Trade in terms of Wholesale Trade and Retail Trade productivity growth. The choice of the time-period 2001-2008

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<sup>1</sup> Performance of Imports and Exports are included as part of Hong Kong's performance as Singapore's Wholesale and Retail trade includes this industry according to its SSIC.

is because of the concern raised by the Singapore government that since 2005, productivity growth in services has been falling. Hong Kong is used as a comparison due to its impressive productivity performance in services especially in Retail Trade and its similarity to Singapore in terms of economic structure and service oriented economy. Furthermore, international productivity comparisons provide useful information to policy makers on the types of policies which are in place and whether they are effective or not (Griffith, 2007). It is thus necessary to compare productivity growth to those in a country that is similar in many respects. A comparison between these two economies would thus provide an interesting study into explanations on their productivity performance as well as evidence of convergence or divergence in their productivity levels.

There are two principal motivations for this study. First, the paper provides a direct comparison of the productivity levels of Hong Kong and Singapore in terms of labour productivity for the period 2001-2008 and total factor productivity (TFP) for the period 2005-2008. As far as the author is aware, a direct comparison of these two economies' Distribution Trade sector based on PPPs rather than exchange rates has not been attempted, thus making the binary comparison a unique study. Second, the divergence in productivity levels between these two economies since 2005 is further explored in respect to existing policies and implications drawn from results. In turn, feasibility and appropriateness of current policies are identified and discussed.

The paper is divided into five sections. Section 3 describes the literature review and methodology employed in the study; section 3 describes the sources used in the paper; section 4 presents and discusses the results of real output and productivity comparisons for the benchmark year and productivity trends from 2001 to 2008. The paper concludes with some brief remarks.

## **2. Literature Review**

Productivity, measured by outputs over inputs, needs clear definition when dealing with Wholesale and Retail trade. Two major issues with regard to the output concept need to be addressed.

First, as noted by Timmer and Inklaar (2005), three output concepts in the trade sector can be used: sales, margins and value added. The authors noted that the changing business models of wholesaling and retailing has resulted in difficulties in international comparisons due to inconsistencies in the output concept, which indicates a statistical measurement issue. However, this issue of output only becomes a problem for a total factor productivity study, not for labour productivity. As noted by Timmer and Inklaar (2005, p.6), “there is a clear consensus that single input productivity measures, such as labour productivity, should be based on value added”.

Second, there are no physical outputs in Wholesale and Retail as noted by Van Ark, Monnikhof and Mulder (1999), Mulder (1999), and Johnston et al. (2000). In essence, the quantity and quality aspects are difficult to capture. Unlike agriculture or manufacturing, where physical output can be distinguished, distribution has no actual physical output. Hill (1977) argued that ‘quantity’ of a service is difficult to distinguish since it often represents a process by which a user (consumer) or the user’s good is changed. Hence, conceptually it is the transfer of property rights of final goods through the distribution chain (Oi, 1992). Unlike goods where their tangible qualities can be recognised, distinguishing quality in services is extremely difficult due to the degree of heterogeneity of the product/service-content (Mulder, 1999). Gilbert and Kravis (1954) identified three types of services: first, identical services across countries; second, services with identical names but different characteristics; and last, services that are unique and exist only in that country. In most cases, services fall under the latter two. This makes the aggregation of services all the more complex. This paper assumes that the characteristics and quality of services in Distribution between Singapore and Hong Kong are similar based on their socio-economic structure, relative level of economic development, export-oriented nature, and highly competitive nature.

Where cross-country comparisons are undertaken, the derivation of meaningful real output and productivity comparisons becomes a problem because it is difficult to compare each country’s output and productivity as monetary values are expressed in each country’s national currency. The use of a common currency converter such as exchange rates is not suitable as they are heavily influenced by capital movements and policy induced exchange rate adjustments and do not reflect the real price differences

between countries. Some well-known studies (see Kravis et al., 1982; OECD, 1992) derived PPP through the expenditure side of national accounts. These PPPs are not however appropriate for use in the current study since this study is a sectoral analysis of output and labour productivity comparisons and they do not produce real product by industry. PPP for this study needs to be derived from the production side in order to develop real output and productivity comparisons.

Van Ark (1993) and Pilat (1994) and Mulder (1999) derived PPPs via a double-deflation approach, but their results were rather erratic due largely to differences in the ICP and ICOP commodity specification<sup>2</sup>. Van Ark, Monnikhof and Mulder (1999) employed a refined version of the ICOP double-deflation approach using gross margins as outputs, but only for the Retail sector. Timmer and Inklaar (2005) compared the TFP of US and EU Distribution Trade based on double-deflation using harmonised output and input measures. Their results showed productivity growth of the US above EU but the gap between the two economies was much less than suggested by estimates based on national accounts data. Despite the encouraging results of the double-deflation approach, the current study adopts the single-deflation approach and uses value added as the output as there was no gross margin data for Singapore.

The study employs the single-deflation ICOP approach of Van Ark, Monnikhof and Mulder (1999)<sup>3</sup>. PPPs for the benchmark year 2005 are derived through a three-stage aggregation process – by group of trades, branch and sector. The first stage derives PPPs at the trade level of similar characteristics in both countries based on an implicit approach using ICP expenditure PPPs shown in Appendix Tables 1 and 2.<sup>4</sup> To illustrate this, in Appendix 1 for SIC code 5031, the PPP of 3.85 is the ratio of HK\$1,985.2 million over SG\$516.1 million whereby the value added HK\$1,985.2 is the product of SG\$516.1 and ICP PPP=3.85. The second stage involves aggregation of the all matched-trade to derive branch level PPPs for Wholesale Trade and Retail Trade. These are displayed in the last rows of Appendix Tables 1 and 2. The

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<sup>2</sup> See Mulder (1999) for detailed explanation on the double-deflation approach.

<sup>3</sup> Detailed description of the ICOP methodology is found in Van Ark, Monnikhof and Mulder (1999).

<sup>4</sup> ICP expenditure PPPs drawn from Asian Development Bank (ADB), *2005 International Comparison Program in Asia and the Pacific: Purchasing Power Parities and Real Expenditures*, Economics and Research Department, Manila, 2007.

third and final stage aggregates the entire branch level PPPs to derive the overall Distribution Trade PPP which is also the Fisher PPP used to deflate Hong Kong output and productivity aggregates into Singapore PPP dollars.

### 3. Sources

The paper employs the International Comparisons of Output and Productivity (ICOP) approach in deriving benchmark year purchasing power parities (PPPs) from detailed data of relevant census publications or survey reports. These data refer to the four-digit level of the Singapore Standard Industrial Classification (SSIC) for Singapore and the three and four-digit level of the Hong Kong Standard Industrial Classification (HSIC) for Hong Kong in their respective Distribution Trade sector<sup>5</sup>. For the benchmark year 2005, data for Singapore were drawn from its *Economic Surveys Series: Wholesale Trade 2005* and *Economic Surveys Series: Retail Trade 2005*. Data for Hong Kong were drawn from the *Report on 2005 Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotels*. Appendix Tables 1 and 2 present the matching exercise from the above sources necessary for the use of the ICOP approach for the benchmark year 2005. The choice of 2005 as the benchmark year is to enable the use of the 2005 ICP expenditure PPPs to derive our first set of PPPs.

Time-series data for value added for Distribution were drawn from each country's national accounts. At the industry level, value added for Singapore were drawn from various issues of *Economic Surveys Series: Wholesale Trade* and *Economic Surveys Series: Retail Trade*, and for Hong Kong these were drawn from various issues of the *Report on Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotels*. Employment figures for Singapore were drawn from the *Singapore Yearbook of Manpower Statistics*. For Hong Kong, employment figures were drawn from various issues of *Report on Annual Survey of Wholesale, Retail and Import and Export Trades*,

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<sup>5</sup> In the *Report on 2005 Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotels*, the Hong Kong Census and Statistics Department reports Wholesale Trade and Import and Export Trades separately whereas Singapore includes the latter in the Wholesale Trade. For consistency in coverage, the paper includes Hong Kong's Import and Export Trades in the Wholesale Trade sector.

*Restaurants and Hotels*. The average number of hours worked per week drawn from International Labour Organization (ILO) *Yearbook of Labor Statistics* (various issues), but these estimates are only available at the Distribution level.

#### **4. Results**

In this section, a comparative analysis of the relative sizes of Singapore and Hong Kong's Distribution Trade Sector are examined. This is followed by the benchmark year comparisons PPPs, relative price levels and labour productivity. Output and labour productivity levels of both economies are examined for the period 2001-2008 and discussed in light of the reforms and policies adopted in each country. Finally, a TFP analysis on Retail Trade for the period 2005-2008 attempts to explain any convergence/divergence between these two economies.

##### **4.1 Relative Size and Structure of the Wholesale and Retail Trade of Hong Kong and Singapore 2005**

Table 1 presents some characteristics of the structure of Singapore's and Hong Kong's Wholesale and Retail Trade Sector, namely operating receipts, value added, and number of persons engaged for the benchmark year 2005<sup>6</sup>. It is important to note that Table 1 values are in national currencies, and as such only general comparisons are made here as more detailed comparisons will be attempted in Section 4.2 when values are based in PPPs.

In Hong Kong, wholesale trade sales were 91 percent of total Distribution sales while Retail trade was 9 percent. In Singapore, the Wholesale trade sales were 96 percent of total Distribution sales while Retail was 4 percent.

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<sup>6</sup> Previous studies disaggregated Wholesale and Retail Trade into Durables and Non-durables. The current study adopts a more specific disaggregation by type of industry trade as this provides a clearer comparison of industry performance between Singapore and Hong Kong.

**Table 1 Operating Receipts, Value Added and Number of Persons Engaged in Wholesale and Retail Trade, Hong Kong and Singapore, 2005 (at national currencies)**

	Operating Receipts (million \$)		Value Added (million \$)		Number of Persons Engaged ('000)	
	HK	Singapore	HK	Singapore	HK	Singapore
Wholesale Trade	2,797,318	836,806	318,086	30,015	529.9	214.0
Household goods	9,635	52,516	1,382	4,043	6.6	52.2
Machinery, fuel & chemicals	121,683	581,394	8,802	18,438	39.8	83.3
General Merchandise	2,629,285	51,695	305,532	1,232	469.6	11.7
Others	36,716	151,201	2,369	6,302	13.8	66.7
Retail Trade	285,793	36,174	43,568	4,235	231.9	105.4
General Merchandise	51,893	7,628	7,478	964	33.2	27.9
Transport Equipment	10,575	15,256	873	1,222	2.8	12.9
Personal goods	31,534	7,289	6,564	1,209	31.8	37.0
Household equipment	133,165	4,436	19,980	528	99.4	13.7
Others	58,625	1,566	8,673	313	64.7	14.0
Distribution	3,083,111	872,979	361,654	34,250	761.8	319.4

Note: Aggregated figures in this table for both Hong Kong and Singapore differ to time-series as the figures here are drawn from survey reports whereas time-series are based on national accounts.

Source: Appendix Tables 1 to 4; Number of persons engaged from *Economics Surveys Series: Wholesale 2005*, *Economics Surveys Series: Retail 2005*; and *Report on 2005 Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotels*.

In terms of value added, both Hong Kong and Singapore had identical contributions to Wholesale and Retail trade at 88 and 12 percent, respectively. This demonstrates their similar characteristics of Distribution Trade. In employment terms, Hong Kong's proportion of Wholesale to Distribution was 70 percent and 30 percent for retail to Distribution, whereas for Singapore, these were 67 percent and 33 percent, respectively. Both countries have Wholesale trade contributing most to value added and employment in Distribution which is expected in these two countries since their economies are heavily dependent on international trade in producer services, which increases demand for producer services internationally (i.e., rising export levels) and generates value added to the Wholesale trade sector and in turn to the Distribution sector.

Comparisons of size of operations in terms of sales per establishment and number of persons engaged per establishment would have also provided details of structures of Distribution at the industry level. However, this comparison was not possible as the coverage of establishment for Hong Kong in the *Report on 2005 Annual Survey of Wholesale, Retail and*



*Import and Export Trades, Restaurants and Hotels* differed to the one in the . “Where separate figures relating to different activities or different locations under the same management are not available, a combined return is accepted and in this case, the reporting unit is treated as an establishment”(Census and Statistics Department, 2006, p.56).

#### 4.2 Purchasing Power Parities, Relative Price Levels and Labour Productivity, 2005

Table 2 presents the Laspeyres, Paasche and Fisher PPPs by type of expenditure category, industry and overall sector for the benchmark year 2005. Comparative price levels for each heading are also presented.

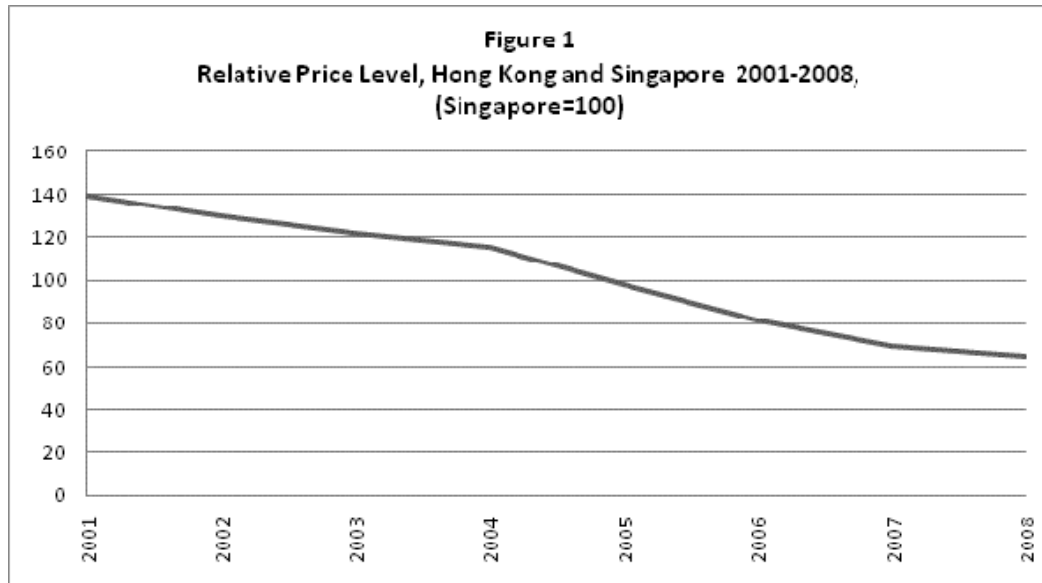
**Table 2 Laspeyres, Paasche and Fisher PPPs for Wholesale and Retail Trade, Hong Kong/Singapore 2005**

	Singapore Quantity weights (Laspeyres PPP)	Hong Kong Quantity weights (Paasche PPP)	Geometric Mean (Fisher PPP)	Relative Price Level (Singapore = 100)
Wholesale Trade	4.47	4.75	4.61	99
Household goods	3.85	3.85	3.85	82
Machinery, fuel & chemicals	4.35	4.35	4.35	93
General Merchandise	4.76	4.76	4.76	102
Others	5.00	5.00	5.00	107
Retail Trade	4.61	4.04	4.32	92
General Merchandise	5.56	5.56	5.56	119
Transport Equipment	4.76	4.76	4.76	102
Personal goods	3.85	3.85	3.85	82
Household equipment	3.45	3.45	3.45	74
Others	5.00	5.00	5.00	107
Distribution	4.50	4.65	4.57	98
Exchange Rate	4.67	4.67	4.67	100

Source: Appendix Tables 1 and 2; Exchange rate from IMF, International Financial Statistics Yearbook (various issues).

The PPP for the Distribution sector is HK\$4.57 per SG\$ compared to the official exchange rate of HK\$4.67. This implies that the price level for the Distribution sector is 2 percent lower in Hong Kong

compared to price level in Singapore. Table 2 also shows variations in relative price levels across expenditure groups for both Wholesale and Retail Trade.



Relative price levels for the period 2001-2008 presented in Figure 1 show a declining trend of Hong Kong's price relative to Singapore. Deflation in Hong Kong occurred during this period starting with the onset of the 1997/98 Asian Financial Crisis which reduced real wealth as a result of the fall in property and equity prices (Schellekens, 2003). Hong Kong's deflation was further extended to 2007 due to a fall in both the relative price of non-tradables and tradable prices attributed to real exchange rate depreciation (Imai, 2010).

Table 3 shows the real output and labour productivity of Hong Kong and Singapore for the benchmark year 2005.<sup>7</sup> Hong Kong's Distribution real output was more than twice of Singapore's, while labour productivity in Hong Kong Distribution was 97 percent of Singapore's level. Labour productivity in Wholesale trade in Hong Kong was 93 percent of Singapore's level and Retail trade was 8.4 percent above Singapore's level.

<sup>7</sup> The Fisher PPPs in Table 2 were used to convert value added of Hong Kong currency into Singapore currency. Labour productivity based on a numeraire currency was then derived, which is simply the ratio of value added over the number of persons engaged.

In Wholesale Trade, the best performing industry for Singapore's was 'machinery, fuels and chemicals' largely driven by Singapore's heavy emphasis on manufacturing industries towards export markets, particularly in electronics, chemicals and petroleum products – the main drivers of the Distribution sector. Furthermore, Singapore is one of the world's major oil refining and distribution centres.

Hong Kong's productivity level for Wholesale Trade 'General Merchandise' was 30 percent above Singapore's. In real output terms, it was fifty times more than Singapore. This industry covers trading firms involved in activities of import and export and Wholesale trade, and is considered one of the Four Key Industries in Hong Kong's economy<sup>8</sup>. According to *Hong Kong Monthly Digest of Statistics March 2010*, Hong Kong's trading accounted for the main part of trading and logistics services<sup>9</sup>. Its share in GDP is approximately 22 percent between 2003 to 2008, which suggests the significant contribution of value added in this industry in Hong Kong. The considerable amount of 'Merchandise Trade' value added also indicates that Hong Kong has a substantial amount of trade activity with China because of its close proximity. Hong Kong has no doubt taken full advantage of this and has turned itself into a trading post for China's products.

In Retail trade, Hong Kong has generally performed better than Singapore. For 'General Merchandise' which consists of departmental stores, supermarkets and convenience stores, Hong Kong's real output is 40 percent above Singapore's while in productivity terms, it is 17 percent above Singapore's level. Except for 'transport equipment', Hong Kong has performed better than Singapore. ESC (2010) noted that lower productivity in Retail Trade in Singapore was due to excess employment of foreign workers. This is an issue that this study will address in Section 4.3.

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<sup>8</sup> Financial services, trading (i.e., Import, export and wholesale trade) and logistics, tourism, and producer and professional services are the Four Key Industries in the Hong Kong economy which have been the driving force of Hong Kong's economic growth.

<sup>9</sup> Hong Kong's trading firms are engaged in two main types of trading activities: (i) conventional trading activities which involve sourcing goods locally and elsewhere (particularly from the mainland of China) for re-exports through Hong Kong to other economies; and (ii) offshore trading activities which involve sourcing goods from and selling goods to parties outside Hong Kong, without the goods passing through Hong Kong. In terms of value added of import and export trade in 2008, 57 percent was related to conventional trade, and 43 percent to offshore trade and other activities (Census and Statistics Department, 2010).

**Table 3 Real Output and Labour Productivity for Wholesale and Retail Trade,  
Hong Kong/Singapore 2005 (in million SG\$)**

	Value Added		Hong Kong/ Singapore (%)	Labour Productivity		Hong Kong/ Singapore (%)
	Hong Kong	Singapore		Hong Kong	Singapore	
Wholesale Trade	69,052	30,015	230.1	130,299	140,278	92.9
Household goods	359	4,043	8.9	54,277	77,375	70.1
Machinery, fuel & chemicals	2,025	18,438	11.0	50,810	221,335	23.0
General Merchandise	64,162	1,232	5,207.6	136,618	104,956	130.2
Others	474	6,302	7.5	34,240	94,519	36.2
Retail Trade	10,091	4,235	238.3	43,515	40,161	108.4
General Merchandise	1,346	964	139.7	40,544	34,562	117.3
Transport Equipment	183	1,222	15.0	65,062	94,569	68.8
Personal goods	1,707	1,209	141.2	53,717	32,682	164.4
Household equipment	5,794	528	1,097.7	58,267	38,643	150.8
Others	1,735	313	554.7	26,823	22,340	120.1
Distribution	79,052	34,250	230.8	103,763	107,227	96.8

Note: Aggregated figures in this table for Hong Kong differs to time-series as the figures in this Table are derived using Table 2 PPPs. Hence any aggregation thereafter will differ to the GVA time-series.

Source: Table 1; Hong Kong value added converted into Singapore dollars using Table 2 Fisher PPPs.

### 4.3 Real Output and Labour Productivity, 2001 – 2008

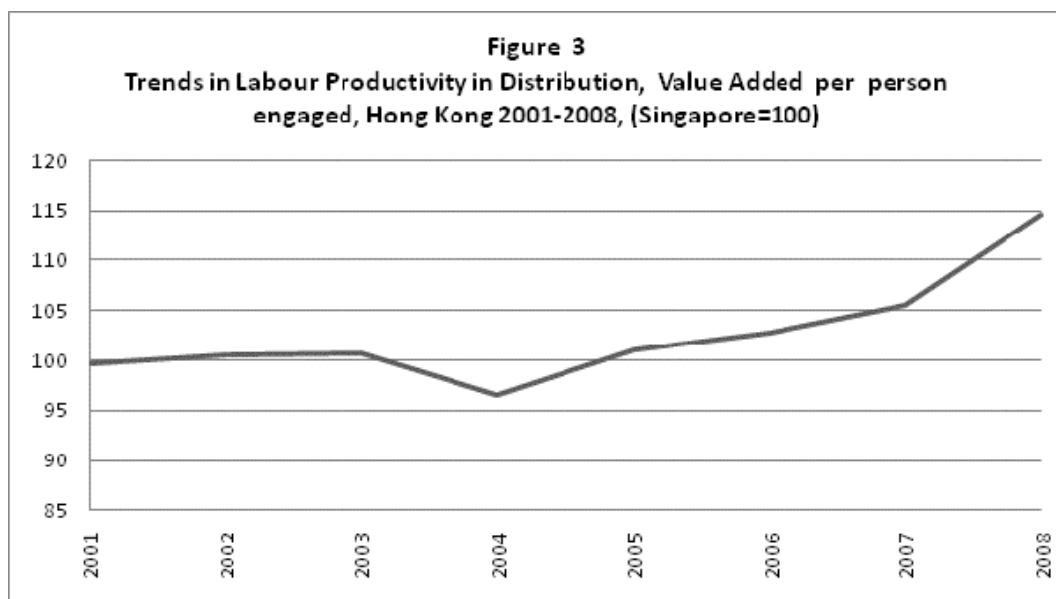
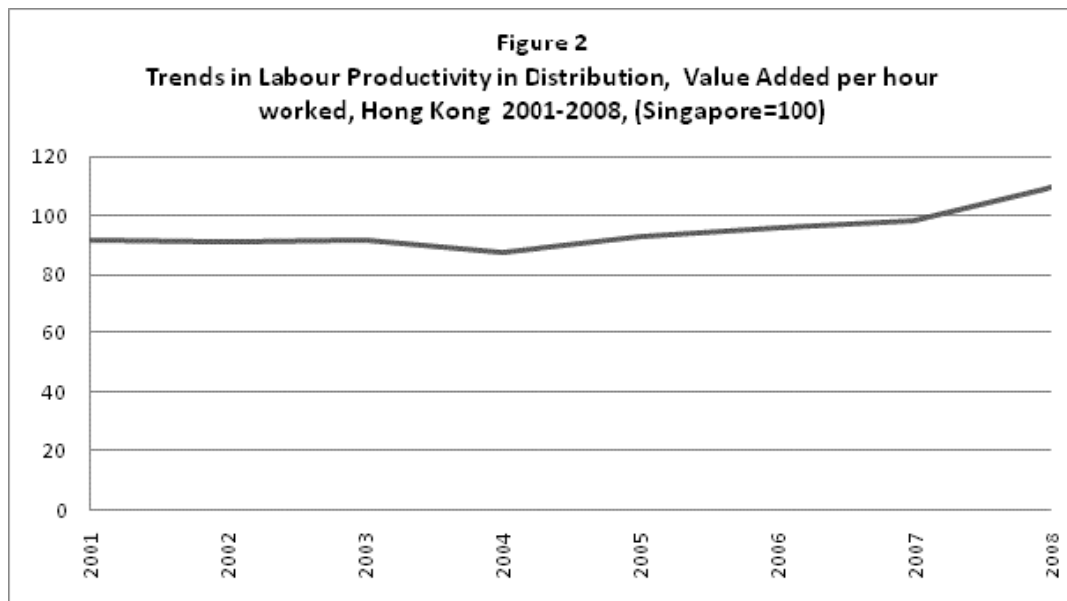
Real output and labour productivity levels of Distribution Trade, Wholesale Trade and Retail Trade for the period 2001-08 are derived by converting the value added series into constant 2005 PPPs using their respective Fisher PPPs of Table 2. The number of persons engaged as an input for labour productivity computation can distort the true productivity level since the Distribution Trade sector is recognised as a sector that employs a significant number of part-time workers. Van Ark, Monnikhof and Mulder (1999) in their study noted that part-time employment in retail trade is much more important in the Netherlands and the US than in France and Germany, implying that average annual working hours per person employed in France and Germany are lower than Netherlands and the US. The use of average annual working hours per person employed for labour productivity measure is a much more accurate measure; however, the current study is limited to the use of number of persons engaged due to lack of annual hours worked at the industry level. It is still possible to present a general trend of labour

productivity of Distribution for this period as average weekly hours worked and number of working weeks was available from the International Labour Organisation<sup>10</sup>.

In terms of labour productivity based on per person per hour worked for Distribution, Figure 2 shows Hong Kong levels to be around 90 percent of Singapore's level from 2001 to 2004. From 2005, Hong Kong improved its labour productivity before overtaking Singapore in 2007. Figure 3 shows labour productivity based on number of persons engaged for Hong Kong performing better than Singapore for most years except 2004. The figure also emphasises the variations between the two countries, for example 2004 and 2007 show more extremes in productivity growth, thus stressing the use of per person per hour worked over number of persons engaged for labour productivity analysis. As stated in Section 2, the study uses the number of persons engaged due to data limitations.

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<sup>10</sup> Total number of hours worked per person was derived by multiplying the average weekly hrs worked multiplied by number of working weeks.



Real output and labour productivity series for Wholesale Trade, Retail Trade and Distribution are presented for Hong Kong and Singapore in Tables 4 and 5, respectively.

**Table 4 Real output and Labour Productivity of Wholesale Trade, Retail Trade and Distribution in Hong Kong, 2001-2008 (2005=100)**

	Real Output			Labour Productivity		
	Wholesale (1)	Retail	Distribution	Wholesale (2)	Retail	Distribution
2001	62	82	64	59	88	63
2002	63	80	65	63	85	66
2003	66	87	69	68	94	72
2004	75	85	76	78	94	80
2005	85	100	87	88	107	90
2006	100	100	100	100	100	100
2007	110	102	109	106	98	106
2008	117	104	115	114	96	111
Average growth	10.3	3.9	9.4	10.7	0.4	8.9

Note: (1) Real output derived by taking the difference of Distribution and Retail Trade as there was no constant price series data for Hong Kong's Wholesale Trade sector.

(2) Number of persons engaged is derived by taking the difference of Distribution and Retail Trade.

Source: Various issues of *Report on Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotel*; *Hong Kong Monthly Digest of Statistics* (various issues).

**Table 5 Real output and Labour Productivity of Wholesale Trade, Retail Trade and Distribution in Singapore, 2001-2008 (2005=100)**

	Real Output			Labour Productivity		
	Wholesale	Retail	Distribution	Wholesale	Retail	Distribution
2001	58	95	63	62	101	67
2002	64	97	68	68	102	72
2003	72	94	75	78	100	80
2004	91	96	91	94	99	95
2005	100	100	100	100	100	100
2006	111	99	109	103	97	104
2007	121	103	118	104	99	107
2008	124	109	122	103	100	105
Average growth	11.5	1.9	10.0	7.4	-0.1	6.8

Source: Various issues of *Economic Surveys Series: Wholesale Trade* and *Economic Surveys Series: Retail Trade*; *Yearbook of Manpower Statistics 2010*.

Average annual growth rate of real output for Distribution in Hong Kong and Singapore was 9.4 percent and 10 percent, respectively, and contributed mainly by their Wholesale Trade – Hong Kong (10.3 percent), Singapore (11.5 Percent) with Retail Trade at a decent 3.9 percent for Hong Kong and 1.9

percent for Singapore. In productivity terms, Hong Kong's Distribution was 8.9 percent of which Wholesale trade was 10.7 percent while Retail trade was 0.4 percent.<sup>11</sup>

As noted by the Government of Hong Kong (2006), significant growth in productivity was in import and export trade, and the large size of this sector contributed significantly to overall productivity growth. In 2003, Mainland China and Hong Kong signed the Closer Economic Partnership Arrangement (CEPA) with the aim of improving trade relationships through the elimination of existing restrictive measures against services and service suppliers and the pursuit of further liberalization of trade in services between them. Since its implementation in 2004, successive rounds of CEPA initiatives have opened up trade relations between Mainland China and Hong Kong with numerous liberalisation measures being adopted, which includes increased number of zero import tariffs for both goods and services and the allowance of Hong Kong companies to access the Mainland China market (HKTDC, 2006). As Hong Kong becomes more integrated with Mainland China and by capitalising on the opportunities arising from the opening up and economic reforms in Mainland China, Hong Kong had been constantly moving towards higher-value-added, knowledge-based activities and training (Government of Hong Kong, 2010).

One such development was the Workplace English Campaign (WEC) launched back in 2000. The WEC targeted workers who frequently used English in their workplace, especially clerks, executives, administrators and junior professionals, frontline service personnel, low proficiency job types, receptionists and operators and secretaries. The objective of the campaign was to strengthen the workforce in English language competency in order to maintain Hong Kong's international competitiveness (Chueng, 2006).

In 2002, the Hong Kong government launched the Continuing Education Fund (CEF), an educational program granting subsidies to adults who wanted to pursue continuing education and training courses. While no study on Hong Kong's productivity associated with training programs/courses has been

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<sup>11</sup> In a report by the Government of Hong Kong (2006), productivity growth for Wholesale and Retail Trade for the period 2000 to 2005 grew at a modest 2.2 percent. It must be noted that this estimate of Hong Kong's productivity for Distribution trade excludes import and export trade industry because this industry is not classified under Distribution in their Industrial Classification). If this industry was taken into account, the average annual growth rate for Distribution would have been 9.7 percent.



done, there are a number of studies which show that improvements in productivity do stem from workforce training (see for example, Holzer et al., 1993; Bartel, 1994; Barrett and O'Connell, 2000; Dearden et al., 2006).

Singapore's labour productivity growth rate of 6.8 percent was mainly driven by its Wholesale Trade, which contributed 7.4 percent while Retail trade was -0.1 percent. As noted by MTI (2009), Wholesale Trade growth was largely due to wholesaling of computers and telecommunications products in high value-added electronics manufacturing industries such as semiconductors and disk media; it is also attributable to Singapore's greater role as a regional and global electronics distribution hub.

Singapore has always been one of the world's largest oil trading centres and contributes significant amounts of value-added from its Wholesale trade of petroleum and petroleum products. In 2001, International Enterprise (IE) Singapore launched the Global Trader Programme (GTP), which essentially gives concessionary tax rates to qualified companies. Since its implementation, Singapore has attracted seven of the world's top ten integrated energy companies to locate their Asian trading headquarters in Singapore (MTI, 2009). These companies are key players in their respective commodity sectors (e.g. Oil & Chemicals), and in tandem with Singapore's growth in Wholesale trade of chemicals and chemical products and Singapore's expanding role in offshore chemicals trading, this has resulted in Singapore's real output in Wholesale Trade in the period 2001-2008 to grow at an impressive rate of 11.5 percent.

In contrast, Hong Kong and Singapore's real output growth and labour productivity for Retail Trade was comparatively low. The average annual real output growth was 3.9 percent for Hong Kong and 1.9 percent for Singapore. Labour productivity average rates were 0.4 percent for Hong Kong and -0.1 percent for Singapore. In 2003, Retail sales fell due to the Severe Acute Respiratory Syndrome (SARS) epidemic, as noted by Keogh-Brown and Smith (2008), and shrunk real output by -2.8 percent in 2003-04. Since 2005, Hong Kong's productivity in Retail trade had been declining whereas Singapore's Retail Trade productivity has more or less remained stagnant for the whole period. This comment would seem to

contradict the ESC (2010) findings that Singapore is performing worse than Hong Kong. It is important to note that ESC (2010) does not state clearly their meaning of productivity – whether it refers to labour productivity or total factor productivity.

#### 4.4 Retail Trade Total Factor Productivity, 2005 – 2008

Thus far the study has only considered partial productivity analysis. An economy-wide study by Davies (1996) demonstrated that Hong Kong's approach of 'high IQ and low-technology' posted high levels of TFP growth above those of Singapore's for the period 1966-1991. While the findings do not specify which sectors are the main productivity drivers, it does suggest that a TFP growth analysis would provide more information on the levels of productivity in Hong Kong and Singapore.

Assuming a constant return-to-scale Cobb-Douglas production function for the Retail Trade sector in Hong Kong and Singapore, the relative levels of TFP in Hong Kong to Singapore can be expressed as

$$\ln(A^X/A^S) = \ln\left[(Y^X/L^X)/(Y^S/L^S)\right] - (1-\alpha)\ln\left[(K^X/L^X)/(K^S/L^S)\right]$$

where  $X$  and  $S$  denotes Hong Kong and Singapore, respectively.  $A$  denotes the joint factor productivity;  $Y$  denotes the real output,  $L$  for number of persons engaged,  $K$  for the nonresidential net capital stock and  $\alpha$  representing the unweighted average of the share of labour compensation in value added in economies  $X$  and  $S$ .

Data on net capital stock were available for Singapore and drawn from the *Economic Surveys Series: Retail Trade*<sup>12</sup>. The data were in current prices and deflated to 2005 prices using the deflators of gross fixed capital formation. As for Hong Kong, there were no net capital stock

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<sup>12</sup> Net capital stock here refers to the net book year-end value of fixed assets plus capital expenditure (i.e., purchases of fixed assets and cost of alteration and major repairs to fixed assets during the year).

data available. These figures were estimated based on the perpetual inventory method (PIM) that uses gross additions to fixed assets drawn from the *Report on Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotels* and deflated to 2005 prices using the non-residential gross domestic fixed capital formation<sup>13</sup>.

**Table 6 Relative Total-factor Productivity of Retail, (Singapore=100), 2005-2008**

	Relative Capital stock in Hong Kong	Relative Retail Value Added in Hong Kong	Relative Capital Productivity in Hong Kong	Relative Capital per employee in Hong Kong	Relative Total- factor Productivity
2005	95.8	238.2	248.7	58.9	207.8
2006	111.9	245.3	219.1	69.0	256.1
2007	132.5	240.6	181.5	79.9	179.8
2008	137.5	228.0	165.8	80.6	143.1

Source: Various issues of *Economic Surveys Series: Retail Trade*; *Yearbook of Manpower Statistics 2010*. Various issues of *Report on Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotels*. Table 4 and 5.

Table 6 presents TFP between Hong Kong and Singapore from 2005 to 2008. Relative capital stock for Hong Kong in terms of Singapore has been increasing over the period. The relative capital per employee for Hong Kong is below Singapore's levels, which suggest that Hong Kong's productivity is largely driven by either efficient use of capital and/or that labour is more skilled, well trained and educated. As noted by Davies (1996), Hong Kong uses less technology per employee than Singapore, the same result as the current study's findings (Table 6). On the whole, TFP levels in Hong Kong have been well above Singapore's levels, although recently there is a falling trend (especially in 2008) that suggests the initial impacts of the global financial crisis.

For period of study, Singapore's average annual growth rate of Retail Trade of 1.9 percent was rising at a slower rate than the number of persons engaged at 2.0 percent, thus explaining Singapore's

<sup>13</sup> For the estimation of the initial value for net capital stock, the paper adopts Hall and Jones (1999) formula in calculating initial capital stock expressed as  $I/(g + \delta)$ , where  $I$  is the initial investment or additions to fixed assets for the initial year,  $g$  is calculated as the average growth rate from 2002 to 2008 of the gross additions to fixed assets series, and  $\delta$  is the rate of depreciation and assumed to be 10 percent per year. Weights used in accordance with the PIM are as follows:  $\alpha$  is the weight for labour which is the proportion of remuneration over value added for Retail. For capital, this is the residual from  $1 - \alpha$ . Both Singapore and Hong Kong had similar but not identical weights and the data to calculate the weights for each year were drawn from *Economic Surveys Series: Retail Trade* (various issues) and the *Report on 2005 Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotels*, respectively. On average  $\alpha$  was approximately 0.54. Finally, net capital stock for Hong Kong are converted into 2005 Singapore dollars using ICP PPPs of 'Machinery and equipment'.

lagging Retail productivity. For the period 2005-2008, these were 2.8 and 2.84 percent, respectively. The rising number of persons engaged for the period 2001-2008 reveals that the number of resident workers rose by only 0.9 percent per annum whereas non-resident workers rose by 9.2 percent<sup>14</sup>. While the number of resident and non-resident workers is for Distribution as a whole, it does suggest that the rising number of foreign workers being employed in this sector does have a negative impact on the productivity growth of Singapore.

Singapore's lagging productivity has led to the development of the ESC (2010) which recommended new investments in skills, expertise and innovative capabilities to achieve economic growth through productivity growth. The recommended policy indicates a steering away from its traditional 'perspiration' approach (i.e., factor accumulation) to a focus on the 'inspiration' approach intended to raise Singapore's TFP growth.<sup>15</sup> ESC (2010) highlights Hong Kong's success largely from its more knowledgeable and experienced workforce. It is tempting to try and emulate Hong Kong's success by simply adopting its approach; however, a 'one-size-fits-all' solution may not always be the solution to address Singapore's lagging productivity. As noted by Member of Parliament (MP) Amy Khor in an interview by Channel NewsAsia in March 2010, "There can be no one-size-fits-all solution to improving productivity....Sector specific analysis of productivity drivers for each industry and customised solutions to improve productivity and innovation for each sector ... needs to be devised".

Grafton, Knowles and Owen (2004), in their study on the correlation between social divergence and TFP, found that TFP was negatively related to three proxies for social divergence (income inequality, ethnic diversity and religious diversity). Their results are based on ordinary least squares and instrumental variable estimation – both statistically and economically significant and support the hypothesis that social divergence reduces TFP. In other words, in the context of Singapore, which currently has a high level of

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<sup>14</sup> Percentages are drawn from *Singapore Yearbook of Manpower Statistics 2010* and *Yearbook of Statistics 2010*, respectively. Number of non-resident workers is a residual figure. This is derived by taking the difference of number of persons engaged from the *Singapore Yearbook of Manpower Statistics 2010* and the number of resident workers drawn from the *Yearbook of Statistics 2010*.

<sup>15</sup> The discussion of perspiration versus inspiration is well-documented in studies by Krugman (1994) and Young (1995).

income inequality, high ethnic diversity and religious diversity, a substantial influx of foreign workers will increase the cultural diversity of Singapore's population and might explain Singapore's low productivity level.<sup>16</sup> The implication for policy makers would thus be to address the social divergence issue through policies to remove barriers to communication across social groups such as the promotion of common languages and/or fostering of cross-cultural awareness.

## 5. Conclusion

This study compared real output and labour productivity in the Distribution Trade Sector of Hong Kong and Singapore from 2001 to 2008. The impressive labour productivity growth in Distribution in both economies was due to the performance of their Wholesale Trade sectors. The findings suggest that these were due to their comparative advantages and effective policies. However, this was not the same for their Retail Trade sector, especially Singapore's. Labour productivity growth for both economies did not fair too well. In terms of TFP growth for the period 2005-2008, Hong Kong was well above Singapore's level, suggesting that their use of capital to labour ratio is more efficient than Singapore's. Furthermore, the increasing numbers of low-skilled foreign workers in Singapore would be a major contributing factor to its low TFP levels whereas Hong Kong enjoyed higher levels of productivity growth from its skilled workforce. There are huge policy implications from these findings. Continuous use of foreign workers is not sustainable if the level of skill remains the same. It is well-known that skill upgrade and education programs do improve productivity levels but the full-effect from such policies may not be fully realised if barriers to communication still exist. The social divergence issue needs to be addressed first to remove the barriers to communication in order for future policies to become more effective.

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<sup>16</sup> Singapore's low productivity is noted in the estimates shown for 2008 in *Yearbook of Statistics 2010* especially in sectors of manufacturing (-10.9 percent), construction (-0.8 percent), and hotel & restaurants (-9.4 percent). These sectors are identified as having high levels of foreign workers. Comparing the percentage growth rate of residents to non-resident workers in these sectors, the results show greater growth rate in non-residents over resident workers which thus supports the explanation to why Singapore is experiencing low productivity.

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**Appendix 1 – Matching of Services by Type of Industry in Wholesale Trade, Singapore and Hong Kong 2005**

SIC code	Singapore Industry	Value Added (million)		PPP (HK/SG)	HSIC code	Hong Kong Industry	Value Added (million)		PPP (HK/SG)
		SG\$ Singapore	HK\$ Hong Kong				HK\$ Hong Kong	SG\$ Singapore	
5031	<b>Household Goods</b> Textiles, clothing, footwear and leather goods	516.1	1,985.2	3.85	6114	<b>Household Goods</b> Clothing, footwear and allied products	1,382.2	359.4	3.85
5051	<b>Machinery and Equipment; Fuels and Chemicals</b> Industrial and construction equipment	7,562.9	32,882.0	4.35	61 (exclude 6111, 6112 & 6114)	<b>Machinery and Equipment; Fuels and Chemicals</b> Other commodities, n.e.c.	8,802.3	2,024.5	4.35
5092	<b>General Merchandise</b> General importers and exporters	1,232.1	5,867.0	4.76	631-632	<b>General Merchandise</b> Imports and exports	305,532.4	64,161.8	4.76
5021	<b>Others</b> Food, beverages and tobacco	1,691.8	8,459.2	5.00	6111- 6112	<b>Others</b> Foodstuffs, Alcoholic drinks and tobacco	2,368.9	473.8	5.00
	<b>Wholesale</b>	11,002.9	49,193.4	4.47		<b>Wholesale</b>	318,085.8	67,019.5	4.75

Source: Singapore data from *Economic Surveys Series: Wholesale Trade 2005*. Hong Kong data from the *Report on 2005 Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotels*.

**Appendix 2 – Matching of Services by Type of Industry in Retail Trade, Singapore and Hong Kong 2005**

SIC code	Singapore Industry	Value Added (million)		PPP (HK/SG)	HSIC code	Hong Kong Industry	Value Added (million)		PPP (HK/SG)
		SG\$ Singapore	HK\$ Hong Kong				HK\$ Hong Kong	SG\$ Singapore	
51101-3	<b>Household Goods</b> Department Stores & Supermarkets	755.8	4,198.7	5.56		<b>General Merchandise</b> Department Stores, Supermarkets and Convenience stores	7,478.4	1,346.1	5.56
5131	<b>Transport Equipment</b> Motor Vehicles, Motorcycles, Scooters & Accessories	1,216.3	5,792.1	4.76	6216	<b>Transport Equipment</b> Transport equipment	872.8	183.3	4.76
5142	<b>Personal Goods</b> Textiles, Clothing, Footwear & Leather Goods	431.6	1,660.1	3.85	6214	<b>Personal Goods</b> Clothing, footwear and allied products	6,563.5	1,706.5	3.85
	<b>Household Equipment</b>	527.9	1,820.2	3.45		<b>Household Equipment</b>	19,980.0	5,794.2	3.45
5143	Furniture, Furnishings & Other Household Equipment	395.0			6215	Consumer goods, n.e.c	16,511.7		
5147	Computers, Telecommunications & Office Equipment	132.9			6217	Durable goods, n.e.c.	3,468.3		
5120	<b>Others</b> Food, Beverages & Tobacco	134.0	670.0	5.00	6211,6212	<b>Others</b> Foodstuffs Alcoholic drinks and tobacco	8,323.2	1,664.6	5.00
	<b>Retail</b>	3,065.6	14,141.1	4.61		<b>Retail</b>	43,218.0	10,694.8	4.04

Source: Singapore data from *Economic Surveys Series: Retail Trade 2005*. Hong Kong data from the *Report on 2005 Annual Survey of Wholesale, Retail and Import and Export Trades, Restaurants and Hotels*.